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PROGRAM OF INCREASE OF EFFECTIVENESS OF THE TECHNIQUE OF MOTOR ACTION IN SPORTS WITH COMPLICATED STRUCTURE OF MOVEMENTS

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Abstract. *Basic provision of the efficiency program aimed to improve the sculling movement technique in athletes in synchronized swimming. Aim: to develop a program for improving the technique of motor activities sports with complicated structure of movements and to test its effectiveness (on the material of synchronized swimming) Material and Methods: theoretical analysis and generalization of literature data, pedagogical experiment, anthropometry, methods of recording and analyzing the movements, quality control and mathematical statistics. Results: grounded and experimentally tested program aimed at improving the "standard" sculling movement technique in "horizontal" basic positions in the mandatory program for athletes 11-12 years old, specializing in synchronized swimming. Conclusions: as a result of the formative experiment the experts' evaluation for the implementation of the experiment of "horizontal" basic positions in athletes of the experimental group was significantly increased ($p<0.05$).Positive changes in the experimental group were also noted in terms of biomechanical structure of the technique. The nature of the marked changes is associated with characteristics of approaching motor action to the second method of the "standard" sculling movement.*

Keywords: *program; sports with complicated structure of movements; sports technique, model, perfection*

Introduction. The current level of development of sports with complicated structure of movements requires the solution of main problems of development of theory of management of training process, the collaboration of effective means and methods of all sides of athletes training, including technical one [2, 12].

Sport result in sports with complicated structure of movements is often determined by judicial assessments on the performance of competition program by female athletes. Its primary component is the technical complexity of demonstrated items.

The experience of advanced practice, as well as literature data [1, 3, 9] indicate the necessity of formation of system of knowledge in the field of training and improvement of the basic elements of technique in sports with complicated structure of movements as a reliable base for further progression and increasing complexity of the technical program of athletes.

The technical skills of female athletes specialized in synchronized swimming are also topical, as evidenced by interested attitude of scientific staff to this issue and reflected in the relevant scientific works [5, 8, 10, 11, 13, 14].

A detailed study of the issues of improvement of basic elements of techniques that form the basis of a compulsory program is presented in fragments in available information sources.

The above determined the direction of our research. Within this publication, as an example for sports with complicated structure of movements, we have presented the generalized structure and sample content of the programme for female entry-level athletes, specializing in synchronized swimming for the improvement of basic elements and techniques of the compulsory program.

Methodology and research organization. Work is implemented on the subject 2,32 "Technical training of qualified athletes based on rationalization of technique of performing competitive exercises" (state registration number Nr. 0116U002571).

The aim of the study was the development of a program of perfection of technique of motor actions in sports with complicated structure of movements and checking its effectiveness (based on the synchronized swimming).

Material and research methods: theoretical analysis and generalization of specialized literature data, pedagogical experiment, anthropometry, methods of registration and motion analysis, qualimetry and mathematical statistics. The study

involved 16 female athletes aged 11-12 years, specializing in synchronized swimming.

The results of the study and their discussion. The programme to improve the techniques of motor actions formed our proposed average models of performing technique of "standard" sculling motion of highly qualified female athletes specialized in synchronized swimming [5, 8]. These models were developed with the consideration of a number of theoretical and practical propositions presented in the works [4, 6, 7].

We also considered the indicators of technology, which according to the results of correlation analysis had a close relationship with model characteristics.

The proposed program aimed at improving technique of standard sculling motion in female athletes aged 11-12 years, specializing in synchronized swimming, and includes: the purpose and objectives, didactic and specific principles, complexes of physical exercises, methods and forms of organization of student control.

Below it is presented a collaborated block diagram of improving the technique of "standard" sculling motion applied in "horizontal" base positions of compulsory programs of synchronized swimming (Figure 1).

The most important tasks for the technical training ofathletes, which were reiterated in the works of Platonov V. N. [12], were adapted to the specificity of sport:

- the achievement of stability and rational variability of specialized motor actions that form the basis of the technology of sculling motions in synchronized swimming;
- sequential transformation of mastered techniques in various horizontal base positions of compulsory program in effective implementation of the exercises of the mandatory program;
- improvement of the structure of motor actions, their dynamics and kinematics taking into account the individual characteristics of female athletes, which meant, in some cases, individual selection of special exercises, number of their repetitions, individual tasks;
- improvement of technical skills of female athletes, based on the requirements of implementation of standard sculling motion, as well as horizontal basic positions of synchronized swimming.

In the program, it was suggested to use preparatory and simulation exercises in the gym and in the water, exercises aimed at developing muscle strength and flexibility in the joints (involved in the implementation of the motor action), as well as exercises aimed at improving rhythm structure of individual indicators (included in the model developed by us) kinematic structure of technique of sculling motions.

Preparatory exercises were used to facilitate the mastery of sports technique through a systematic, phased implementation of simple motor actions, providing performance of the basic movement. Simulation exercises were used for improving technical skills, as they allow you to create an idea about the technique of "standard" sculling motion, provide the best setting of coordination structure of movements directly before the competition and contribute to the setting of optimum coordination structure of "standard" sculling motion.

We took into account that the implementation of "standard" sculling motion provided the conditions that facilitate the mastery of motor actions which at the initial stages have a positive effect. For example, such positions of compulsory program as the standard position "On back", "Grouping" were used both in the gym, and in water as facilitating conditions. "Horizontal" base position of the compulsory program in water were performed by female athletes with additional equipment and physical-technical means, providing a facilitating impact ("noodles", swimming boards, creating a support for gymnasts on the side of the pool, swimming track, etc.). At the later stages of the process of improvement techniques of sculling motions of female athletes specialized in synchronized swimming, the conditions were used that have a hindering impact in the performance of these physical activities (both indoor and in water).

Complicated conditions of performing of these motor actions in the gym were provided with the use of rubber shock absorber and the weight of the dumbbells (weighing 0,5-1 kg) with exercises to improve technique of sculling movements. Herewith, there mainly were used simulation exercises in the "horizontal" base positions of compulsory program.

The restriction or expansion of the spatial boundaries of performing techniques and actions were reproduced by fixing the angles in the implementation of "standard" sculling motion (in particular, there were applied the tapes to provide fixation of angles in joints). These sculling motions were used while performing the figures of the compulsory program.

In the process of improvement technique of sculling motions of female athletes specialized in synchronized swimming, were also used the ways that complicated the performing of motor actions (exercises performed both indoors and in water) in conditions of heightened emotional tension (typically before or in the process of competitive activity), distraction or distributed attention, the complicated activity of individual analyzers (primarily due to the performing of the set of motor actions without visual control) etc.

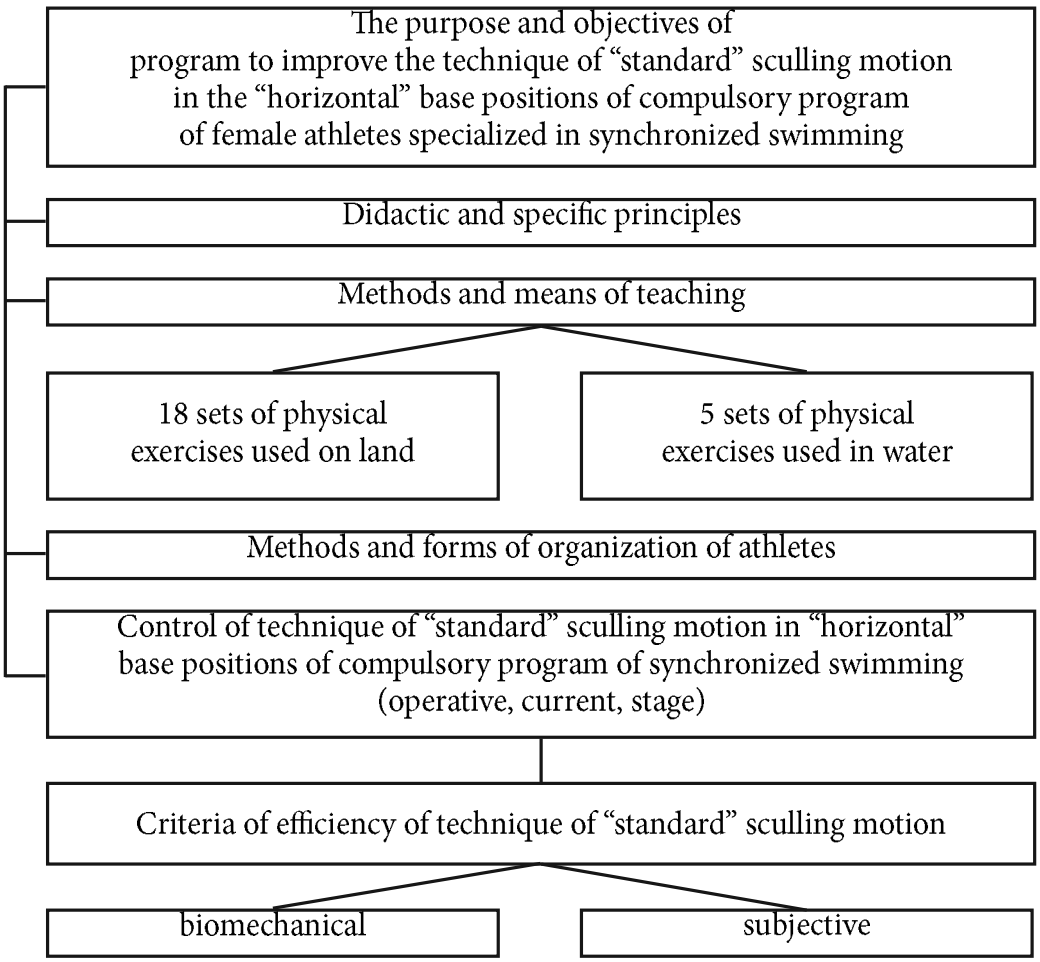

Fig. 1. Structural scheme of program implementation in improving the technique of motor actions in sports with complicated structure of movements adapted for female athletes aged 11 and 12 years, specializing in synchronized swimming

The suggested exercises aimed at improvement of technique of "standard" sculling motion, depending on their complexity and orientation to the correction of separate "technical" elements, were included in the set of physical exercises which have been integrated into the training of female athletes.

Operational control over the accuracy and stability of how female athletes performed elements of the technique which were in the process of perfection, was carried out by the trainer with the method of visual observation.

At the end of each mesocycle was conducted a current control using a method of video shooting. There has been conducted individual analysis of video materials and a discussion of technical errors made by female athletes. Such data analysis gave operative information on progress of

improvement of techniques of sculling motions.

At the end of preparatory period of the annual training cycle was conducted a phased control. The used methods were video shooting and video and computer analysis.

As criteria of efficiency of the process of improvement of techniques of sculling motions of female athletes specialized in synchronized swimming, were used the developed model biomechanical indicators of technique of "standard" sculling motion while performing "horizontal" basic positions of compulsory program, as well as subjective criteria [5, 8].

Implementation of the program aimed at improvement of the technique of motor actions was carried out in the preparatory period of the annual cycle of training process of female athletes of the experimental group (n=8) aged 11-12 years, specializing in synchronized swimming. The control group of female athletes (n=8) was engaged in a general training program.

Taking into account the recommendations presented in special literature [1,8], as well as modern trends in the development of synchronized swimming, in the preparation of the annual training cycle, as well as sets of physical exercises, was considered the necessity at this stage of long-term sports perfection, to provide conditions for mastering comprehensive and various motor actions by female athletes, creating a broad base of motor abilities, contributing to the successful mastering of more complex technical elements in the subsequent stages of long-term preparation.

According to the recommendations of curriculum in synchronized swimming for CYSS, CYSOR, SHSM and SCSS, during the week it was planned nine training sessions. Proposed physical exercises were applied three times per week in the main part of the lesson, and mastered complexes were used daily in a special warm-up, both on land and in water.

Significant or average load was usually planned at the training session. Herewith in this special warm-up of each training session the mastered sets of physical exercises were used.

As a result of a formative experiment, evaluation of experts for the implementation of "horizontal" basic positions in female athletes of the experimental group statistically significantly increased ($p<0,05$). Dynamics of change of these indicators (for example, "horizontal" basic position "Ballet leg") before and after formative experiment is characterized by an increase of assessment for: the reduction of distance covering of a female athlete (in the lengthwise, transverse, diagonal, circular directions) – from $\bar{x}$=5,1 (S=0,2) to $\bar{x}$=6,1 (S=0,1) points; retention of the level of body height above the water surface – from $\bar{x}$=5,06 (S=0,02) to $\bar{x}$=6,25 (S=0,2) points; decrease of vibrations of legs (vertical and horizontal) – from $\bar{x}$=5,03 (S=0,1) to $\bar{x}$=6,18 (S=0,2) points; a decrease in the intensity of waves on the water surface – from $\bar{x}$=5,08 (S=0,04) to $\bar{x}$=6,09 (S=0,04) points; the improvement of "geometry" of body –from $\bar{x}$=5,21 (S=0,4) to $\bar{x}$=6,3 (S=0,1) points. Overall rating for the implementation of this "horizontal" basic position statistically significantly increased from $\bar{x}$=5,09 (S=0,12) to $\bar{x}$=6,19 (S=0,1) points ($p<0.05$).

The recorded positive dynamics of these indicators in female athletes of the control group before and after experiment was not statistically significant ($p>0,05$).

Positive changes in the experimental group were also marked by indicators of biomechanical structure of technique, the modification of which is connected with the approximation of features of the motor action to the second method of a standard sculling motion, which is reflected in a statistically significant ($p<0,05$): decrease in length trajectories of the CM hand in a horizontal plane at $\bar{x}$=0,07 m (S=0,02); reduction of the duration of sculling cycle at $\bar{x}$=0,08 s (S=0,01); the decrease in the angle formed by the transverse axis of the hand and the horizontal line at $\bar{x}$=71° (S=4); the increase in the resulting speed of CM hands throughout the sculling cycle $\bar{x}$=0,58 м·с$^{-1}$ (S=0,02) etc.

Conclusion. The developed pilot program to improve the technique of "standard" sculling motion in the "horizontal" base positions included 23 physical exercises, the orientation of which is focused on improving the efficiency of technique of "standard" sculling motion, and the extension of the range of motor abilities of female athletes aged 11-12 years, specializing in synchronized swimming and the main components of which are: the purpose and objectives, didactic and specific principles, means and methods of training, methods and forms of organization of athletes,

the control with the account of the results of study of biomechanical and subjective efficiency criteria.

Approbation of the program in the training process of the annual training cycle of female athletes aged 11-12 years aimed at improving technique of "standard" sculling motion in a "horizontal" basic position, has shown its effectiveness, which influenced increasing assessments for the implementation of horizontal basic positions and changing the number of model biomechanical parameters of technique of sculling movements.

Prospects for further research are related to the development of programs of perfection of technique of motor actions in sports with complex coordination structure of movements on the basis of the proposed approach.

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